

**APPLICATION**

**FOR UNITED STATES LETTERS PATENT**

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**SPECIFICATION**

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, **Lanny D. Billings**, a citizen of the United States, have  
invented a new and useful stone cutting system of which the following is a specification:

1  
2 **Stone Cutting System**  
3  
4

5 **CROSS REFERENCE TO RELATED APPLICATIONS**  
6

7 Not applicable to this application.  
8  
9

10  
11 **STATEMENT REGARDING FEDERALLY**  
12 **SPONSORED RESEARCH OR DEVELOPMENT**  
13

14 Not applicable to this application.  
15  
16

17 **BACKGROUND OF THE INVENTION**  
18  
19  
20

21 **Field of the Invention**  
22

23 The present invention relates generally to stone cutting devices and more  
24 specifically it relates to a stone cutting system for efficiently cutting stones of various  
25 shapes and sizes.  
26  
27

28 **Description of the Related Art**  
29

30 Stone cutter devices have been in use by stone masons for years for cutting  
31 individual stones into a desired shape and size. Conventional stone cutters are  
32 typically hand-operated tools with a stone cutting blade that are only capable of cutting

1 one stone at a time. Conventional stone cutters are typically utilized for cutting flat  
2 tile (e.g. ceramic, stone) and are not suitable for cutting a body of a stone into two or  
3 more segments.

4  
5 U.S. Patent No. 6,263,866 to Tsao teaches a conventional stone cutter that has a  
6 cutting stone that is designed solely for cutting a flat tile member. U.S. Patent No.  
7 4,520,880 to Saito teaches a stone cutter that divides a mass of stone into pieces such  
8 as large stones found at a rock quarry.

9  
10 Another type of stone cutter is manufactured by VINCI STONE PRODUCTS,  
11 INC. under the trademark PORTA CUT. The PORTA CUT is a hydraulic stone cutter  
12 that utilizes a vertical blade pressed into the stone by a plurality of hydraulic cylinders  
13 thereby splitting the stone into a desired shape and size.

14  
15 The prior art technology of stone cutting does not teach a system for efficiently  
16 cutting stones of various shapes and sizes. Conventional stone cutters typically require  
17 the stone to be precut into a desired shape (e.g. flat) and can only cut one stone at a  
18 time.

19  
20 While these devices may be suitable for the particular purpose to which they  
21 address, they are not as suitable for efficiently cutting stones of various shapes and  
22 sizes. Conventional stone cutters are not as suitable for efficiently cutting stones of  
23 various shapes and sizes.

24  
25 In these respects, the stone cutting system according to the present invention  
26 substantially departs from the conventional concepts and designs of the prior art, and  
27 in so doing provides an apparatus primarily developed for the purpose of efficiently  
28 cutting stones of various shapes and sizes.

1  
2                   **BRIEF SUMMARY OF THE INVENTION**  
3

4           In view of the foregoing disadvantages inherent in the known types of stone  
5 cutting devices now present in the prior art, the present invention provides a new stone  
6 cutting system construction wherein the same can be utilized for efficiently cutting  
7 stones of various shapes and sizes.  
8

9           The general purpose of the present invention, which will be described  
10 subsequently in greater detail, is to provide a new stone cutting system that has many  
11 of the advantages of the stone cutting devices mentioned heretofore and many novel  
12 features that result in a new stone cutting system which is not anticipated, rendered  
13 obvious, suggested, or even implied by any of the prior art stone cutting devices, either  
14 alone or in any combination thereof.  
15

16           To attain this, the present invention generally comprises a retaining unit having  
17 a plurality of troughs capable of retaining a plurality of stone members, and a cutting  
18 unit having a plurality of blades that are extendable within each of the troughs for  
19 cutting the stone members.  
20

21           There has thus been outlined, rather broadly, the more important features of the  
22 invention in order that the detailed description thereof may be better understood, and  
23 in order that the present contribution to the art may be better appreciated. There are  
24 additional features of the invention that will be described hereinafter and that will form  
25 the subject matter of the claims appended hereto.  
26

27           In this respect, before explaining at least one embodiment of the invention in  
28 detail, it is to be understood that the invention is not limited in its application to the  
29 details of construction and to the arrangements of the components set forth in the

1 following description or illustrated in the drawings. The invention is capable of other  
2 embodiments and of being practiced and carried out in various ways. Also, it is to be  
3 understood that the phraseology and terminology employed herein are for the purpose  
4 of the description and should not be regarded as limiting.

5  
6 A primary object of the present invention is to provide a stone cutting system  
7 that will overcome the shortcomings of the prior art devices.

8  
9 A second object is to provide a stone cutting system for efficiently cutting  
10 stones of various shapes and sizes.

11  
12 Another object is to provide a stone cutting system that is capable of  
13 simultaneously cutting a plurality of stones.

14  
15 An additional object is to provide a stone cutting system that is capable of  
16 cutting a stone into two or more pieces.

17  
18 A further object is to provide a stone cutting system that is capable of cutting  
19 various types of stone material.

20  
21 Another object is to provide a stone cutting system that is capable of cutting  
22 stones into various widths.

23  
24 Other objects and advantages of the present invention will become obvious to the  
25 reader and it is intended that these objects and advantages are within the scope of the  
26 present invention.

27  
28 To the accomplishment of the above and related objects, this invention may be  
29 embodied in the form illustrated in the accompanying drawings, attention being called

1 to the fact, however, that the drawings are illustrative only, and that changes may be  
2 made in the specific construction illustrated and described within the scope of the  
3 appended claims.

1  
2                   **BRIEF DESCRIPTION OF THE DRAWINGS**  
3

4           Various other objects, features and attendant advantages of the present  
5 invention will become fully appreciated as the same becomes better understood when  
6 considered in conjunction with the accompanying drawings, in which like reference  
7 characters designate the same or similar parts throughout the several views, and  
8 wherein:  
9

10           FIG. 1 is an upper perspective view of the present invention.  
11

12           FIG. 2 is an upper perspective view of the present invention with the blades  
13 cutting the stone members within one of the troughs.  
14

15           FIG. 3 is a side view of the present invention.  
16

17           FIG. 4 is a side view of the present invention illustrating the blades cutting the  
18 stone members within a first trough.  
19

20           FIG. 5 is a side view of the present invention illustrating the blades cutting the  
21 stone members within a second trough.  
22

23           FIG. 6 is a side view of the blades positioned above a third trough within the  
24 retaining unit.  
25

26           FIG. 7 is an end cutaway view of the blades cutting the stone members into  
27 stone pieces.  
28

FIG. 8a is an upper perspective view of the cutting unit with the blades in the raised position.

FIG. 8b is an upper perspective view of the cutting unit with the blades in the lowered position.

FIG. 9 is an exploded upper perspective view of the retaining unit with respect to the support stand and conveyor.



## DETAILED DESCRIPTION OF THE INVENTION

### *A. Overview*

Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, FIGS. 1 through 9 illustrate a stone cutting system 10, which comprises a retaining unit 20 having a plurality of troughs 22 capable of retaining a plurality of stone members 12, and a cutting unit 40 having a plurality of blades 42 that are extendable within each of the troughs 22 for cutting the stone members 12.

### *B. Retaining Unit*

The retaining unit 20 has at least one trough 22 capable of receiving a plurality of naturally shaped stone members 12. As shown in Figures 1 and 9 of the drawings, the retaining unit 20 preferably has a plurality of troughs 22 substantially parallel to one another. The troughs 22 are preferably comprised of an elongate structure with a uniform width as further shown in Figures 1 and 9 of the drawings. The troughs 22 are preferably formed for non-movably receiving a plurality of stone members 12 in a longitudinal manner as shown in Figure 1 of the drawings.

The troughs 22 are formed by one or more partition walls 23 that may be adjustable to allow for adjustment of the width of the troughs 22. The plurality of troughs 22 may have varying widths to accommodate various sizes of stone members 12.

Each of the troughs 22 includes a floor 28 for supporting the stone members 12. The floor 28 preferably includes a plurality of slots that allow for the passing through of a plurality of cut stone pieces 14 as shown in Figures 1 and 7 of the drawings. The slots are sized to allow for proper support of the stone members 12 prior to cutting

1 while allowing for the cut stone pieces 14 to freely pass through onto the conveyor unit  
2 30. The plurality of slots are preferably substantially parallel to a longitudinal axis of  
3 the troughs 22 as shown in Figure 1 of the drawings. Alternatively, the floor 28 may  
4 be movably attached (e.g. pivotal, removable, etc.) to the retaining unit 20 for allowing  
5 the passing through of a plurality of cut stone pieces 14.

6  
7 Each of the troughs 22 preferably includes a compression member 26 at an end  
8 thereof that is capable of compressing a plurality of stone members 12 in a  
9 longitudinal manner as shown in Figures 1, 7 and 9 of the drawings. At least one  
10 actuator unit 25 is preferably attached to the compression member 26 and the retaining  
11 unit 20 for extending/retracting the compression member 26 as shown in Figure 7 of  
12 the drawings. The actuator unit 25 may be comprised of an electrical actuator or  
13 hydraulic actuator. An end member 24 is preferably positioned opposite of the  
14 compression member 26 which may be comprised of a severable material such as wood  
15 for receiving a portion of the blades 42 during cutting.

16  
17 The retaining unit 20 is preferably movably positioned with respect to the  
18 cutting unit 40 along a path substantially transverse to a cutting path of the cutting unit  
19 40 as shown in Figures 1 through 6 of the drawings. One or more support rails 21  
20 attached to a support stand 29 and to the retaining unit 20 allow for the retaining unit  
21 20 to move horizontally with respect to the cutting unit 40 as shown in Figures 3  
22 through 6 of the drawings. The retaining unit 20 may be manually manipulated or  
23 mechanically manipulated via an actuator or similar device.

#### 24 25 **C. Cutting Unit**

26 The cutting unit 40 has at least one blade capable of cutting through a stone  
27 material (e.g. granite). The cutting unit 40 is preferably comprised of a gang saw  
28 structure wherein multiple blades 42 may be interchanged and spaced apart a desired  
29 distance for cutting stone members 12 of different sizes and for creating stone pieces

1 14 of different widths. The blades 42 are capable of being extended within the at least  
2 one of the troughs 22 for cutting a plurality of stone members 12 into a plurality of  
3 stone pieces 14 as shown in Figures 2 and 7 of the drawings.

4  
5 The cutting unit 40 is preferably movable in a vertical manner to allow for  
6 lowering of the cutting blades 42 into the troughs 22 of the retaining unit 20 as shown  
7 in Figures 1 and 2 of the drawings. The cutting unit 40 is also preferably movable in a  
8 horizontal manner substantially parallel to the at least one trough 22 for cutting the  
9 stone members 12.

10  
11 The cutting unit 40 may be comprised of a motor 44 mechanically attached to a  
12 shaft supporting the blades 42 mounted upon a platform as shown in Figures 8a and 8b  
13 of the drawings. The platform is slidably supported upon a support member 46 and is  
14 mechanically connected to a manipulation structure (e.g. cable, chain, etc.) for  
15 positioning the platform in a desired location along the support member 46.

16  
17 A pair of opposing vertical supports 48 are attached to the opposing ends of the  
18 support member 46 for vertically supporting the support member 46 in an adjustable  
19 manner as shown in Figures 8a and 8b of the drawings. The support member 46 may  
20 be vertically adjusted with respect to the vertical supports 48 via a conventional  
21 lifting/lower structure such as an actuator or chain/cable structure.

#### 22 23 **D. Conveyor Unit**

24 The conveyor unit 30 is preferably positioned beneath the retaining unit 20 for  
25 transferring a plurality of cut stone pieces 14 that fall through the floor 28 within the  
26 retaining unit 20. The conveyor unit 30 is preferably positioned beneath the support  
27 stand 29 as shown in Figures 1 through 7 of the drawings. The conveyor unit 30 may  
28 be comprised of any conventional conveyor structure.

1     **E.     Operation**

2             In use, the user first adjusts the troughs **22** within the retaining unit **20** to their  
3     desired widths in order to accommodate the various sizes and shapes of stone members  
4     **12**. Once the troughs **22** are organized, the user then positions the appropriate sized  
5     stone members **12** within the troughs **22** as shown in Figures 1 and 9 of the drawings.  
6     Once the troughs **22** are filled with the stone members **12** end-to-end in a longitudinal  
7     manner, the user then manipulates the compression member **26** within each of the  
8     troughs **22** to compress the stone members **12** together in a relatively tight manner.  
9     The user next determines the desired thickness of the stone pieces **14** to be cut and  
10    adds/removes the appropriate number of blades **42** from the cutting unit **40**. The user  
11    may also adjust the spacing between the blades **42** to create stone pieces **14** having  
12    varying widths.

13  
14            Once the stone members **12** have been properly compressed together and the  
15    desired number of blades **42** have been installed, the user then operates the cutting unit  
16    **40** to rotate the blades **42** and then lowers the cutting unit **40** so that the blades **42**  
17    begin to cut the stone members **12** within the first trough **22** as shown in Figures 2  
18    through 4 of the drawings. As the stone members **12** are cut into a plurality of stone  
19    pieces **14** (each having at least one flat surface), the stone pieces **14** fall through the  
20    slots within the floor **28** of the trough **22** as shown in Figure 7 of the drawings. The  
21    cutting unit **40** moves longitudinally along the first trough **22** cutting the stone  
22    members **12** within the first trough **22** as further shown in Figure 7 of the drawings.  
23    The cutting unit **40** is capable of sensing the hardness of the stone members **12** being  
24    cut and adjusts the movement speed accordingly.

25  
26            After the stone members **12** within the first trough **22** have been completely cut  
27    into stone pieces **14**, the cutting unit **40** is then elevated and the retaining unit **20** is  
28    moved so that the second trough **22** is aligned with the blades **42** as shown in Figure 5  
29    of the drawings. The user may have to adjust the number/spacing of the blades **42** if

1 the second trough **22** is a different width. The user then uses the cutting unit **40** to cut  
2 the stone members **12** contained within the second trough **22**. The above-stated  
3 process continues until all of the stone members **12** within the retaining unit **20** have  
4 been cut into the desired stone pieces **14**. The cut stone pieces **14** may then be further  
5 processed (e.g. polishing, etching, etc.).

6  
7 What has been described and illustrated herein is a preferred embodiment of the  
8 invention along with some of its variations. The terms, descriptions and figures used  
9 herein are set forth by way of illustration only and are not meant as limitations. Those  
10 skilled in the art will recognize that many variations are possible within the spirit and  
11 scope of the invention, which is intended to be defined by the following claims (and  
12 their equivalents) in which all terms are meant in their broadest reasonable sense  
13 unless otherwise indicated. Any headings utilized within the description are for  
14 convenience only and have no legal or limiting effect.